CLAIMS

1. A heat exchanger stack including at least first and second nestable plates formed of a plate material being substantially unresponsive to electromagnetic impulse welding, and wherein each said plate includes:

   a) a generally flat central portion having a plurality of protrusions protruding from at least one surface thereof; and

   b) at least one pair of edge portions generally formed non-coplanar relative to said generally flat central portion,

   wherein said at least first and second plates are arranged in a nesting arrangement and spaced apart by said protrusions so as to define therebetween a space through which a heat exchange medium may flow,

   wherein said at least first and second plates are affixed together by electromagnetic pulse welds at a plurality of welding locations which include said protrusions and said at least one pair of edge portions,

   and wherein said at least first and second plates are mutually connected at said welding locations via a facilitator substrate, which is highly responsive to electromagnetic impulse welding, and which is disposed on at least one of said at least first and second plates.

2. A heat exchanger stack in accordance with claim 1, wherein said facilitator substrate is selectively applied to at least one surface of said edge portions of at least one of said at least first and second nestable plates.

3. A heat exchanger stack in accordance with claim 1, wherein said facilitator substrate is selectively applied to at least one surface of said protrusions of said at least first and second nestable plates.

4. A heat exchanger stack in accordance with claim 1, wherein a substrate of a non-conductive material is selectively applied to at least one surface of said edge portions and to said generally flat central portion of at least one of said first and second

nestable plates, thereby to provide resistance to electromagnetic impulse welding thereto.

5. A heat exchanger stack including at least first and second nestable plates formed of a plate material being substantially unresponsive to electromagnetic impulse welding, and wherein each said plate includes:

   a) a generally flat central portion having a plurality of protrusions protruding from at least one surface thereof; and

   b) at least one pair of edge portions generally formed non-coplanar relative to said generally flat central portion,

   wherein said at least first and second plates are arranged in a nesting arrangement and spaced apart by said protrusions so as to define therebetween a space through which a heat exchange medium may flow,

   wherein said at least first and second plates are affixed together by electromagnetic pulse welds at a plurality of welding locations which include said protrusions and said at least one pair of edge portions,

   and wherein said at least first and second plates are mutually connected at said welding locations via an intervening facilitator material, which is highly responsive to electromagnetic impulse welding.

6. A heat exchanger stack in accordance with claim 5, wherein said intervening facilitator material provides a joining medium in said plurality of welding locations.

7. A method for forming a heat exchanger stack from a plurality of heat exchanger plates formed of a plate material being substantially unresponsive to electromagnetic impulse welding, wherein the plurality of plates includes at least first and second nestable plates, each having a generally flat central portion and having at least a pair of edge portions generally non-coplanar relative to the flat central portion of the plate, and wherein each plate is formed so that in a stacked, nested disposition, the generally flat central portions of the plates, having similar protrusions formed on both surfaces thereof, are spaced apart thereby to define therebetween a space

through which a heat exchange medium may be passed, the method includes the steps:

a) applying a facilitator substrate, which is highly responsive to electromagnetic impulse welding, to at least one surface of the edge portions and selectively to at least one surface of the generally flat central portion of each plate;

b) disposing the first and second exchanger plates in nesting arrangement on a support; such that the central portions and the edge portions of the two plates are spaced apart; and

c) exposing the facilitator substrate applied to at least one of the first and second heat exchanger plates to a source of electromagnetic impulse energy, so as to apply thereto a kinetic force causing the facilitator substrate to induce the edge portions and selected portions of the flat central portion to bend away from the source of electromagnetic impulse energy, such that the edge portions and the protrusions impinge on the respective edge portions and protrusions of the other plate, so as to become joined thereto.

8. A method according to claim 7 wherein said step of disposing the first and second heat exchanger plates on a support includes disposing at least one heat exchanger plate in supporting contact with a shaped surface defined by the support.

9. A method according to claim 7, wherein said method includes, a step prior to said step a), of:

applying a non-conductive substrate to at least one surface of the edge portions of each plate and to preselected portions adjacent to the protrusions of the generally flat central portions of each plate, which provides resistance to electromagnetic impulse welding thereto.

10. A method for forming a heat exchanger stack from a plurality of plates formed of a plate material being substantially unresponsive to electromagnetic impulse welding, wherein the plurality of plates includes at least first and second nestable plates, each having a generally flat central portion and at least a pair of edge portions generally non-coplanar relative to the central portion of the plate, wherein each plate has a

plurality of protrusions which is formed so that, when the plates are in a stacked, nested position, the respective opposing pluralities of protrusions of the first and second plates are disposed in close spaced apart proximity to each other, and that the respective central portions of the plates are spaced apart, thereby to define therebetween a space through which a heat exchange medium may be passed, wherein the method includes:

a) applying a facilitator substrate, which is highly responsive to electromagnetic impulse welding, to at least one surface of the edge portions of each plate and to preselected portions adjacent to the protrusions of the generally flat central portions of each plate;

b) disposing the first and second exchanger plates in nesting arrangement on a support; such that the central portions and the edge portions of the two plates are spaced apart; and

c) exposing the facilitator substrate applied to at least one of the first and second heat exchanger plates to a source of electromagnetic impulse energy, so as to apply thereto a kinetic force causing the facilitator substrate to induce the edge portions and selected portions of the flat central portion to bend away from the source of electromagnetic impulse energy, such that the edge portions and the protrusions impinge on the respective edge portions and protrusions of the other plate, so as to become joined thereto.

11. A method according to claim 10, wherein said step of disposing the first and second heat exchanger plates on a support includes disposing at least one heat exchanger plate in supporting contact with a shaped surface defined by the support.

12. A method in accordance with claim 10, wherein said method includes, a step prior to said step a), of:

applying a non-conductive substrate to at least one surface of the edge portions of each plate and to preselected portions adjacent to the protrusions of the generally flat central portions of each plate, which provides resistance to electromagnetic impulse welding thereto.

13. A method for forming a heat exchanger stack from a plurality of heat exchanger plates formed of a plate material being substantially unresponsive to electromagnetic impulse welding, wherein the plurality of plates includes at least first and second nestable plates, each having a generally flat central portion and having at least a pair of edge portions generally non-coplanar relative to the flat central portion of the plate, and wherein each plate is formed so that in a stacked, nested disposition, the generally flat central portions of the plates, having similar protrusions formed on both surfaces thereof, are spaced apart thereby to define therebetween a space through which a heat exchange medium may be passed, the method includes the steps:

a) applying a facilitator material, which is highly responsive to electromagnetic impulse welding, to at least one surface of the edge portions and selectively to at least one surface of the generally flat central portion of each plate;

b) disposing the first and second exchanger plates in nesting arrangement on a support; such that the central portions and the edge portions of the two plates are spaced apart; and

c) exposing the facilitator applied to at least one of the first and second heat exchanger plates to a source of electromagnetic impulse energy, so as to apply thereto a kinetic force causing the facilitator material to induce the edge portions and selected portions of the flat central portion to bend away from the source of electromagnetic impulse energy, such that the edge portions and the protrusions impinge on the respective edge portions and protrusions of the other plate, so as to become joined thereto by the intervening facilitator material.

14. A method according to claim 13, wherein said step of disposing the first and second heat exchanger plates on a support includes disposing at least one heat exchanger plate in supporting contact with a shaped surface defined by the support.